

# Introduction to Tactical Combat Casualty Care

## 02 June 2014





# Pre-Test





# **What is TCCC and Why Do I Need to Learn about it??**



- **Coalition forces presently have the best casualty treatment and evacuation system in history.**
- **TCCC is what will keep you alive long**



## Comparison of Statistics for Battle Casualties, 1941-2005

*Holcomb et al J Trauma 2006*

**The U.S. casualty survival rate in Iraq and Afghanistan has been the best in U.S. history.**

	World War II	Vietnam	OIF/OEF
CFR	19.1%	15.8%	9.4%

Note: CFR is the Case Fatality Rate – the percent of those wounded who die



# Why Are We Doing Better?

- Improved Personal Protective Equipment
- **Tactical Combat Casualty Care**
- Faster evacuation time
- Better trained medics

*Holcomb et al J Trauma 2006*



# **TCCC: The New Standard of Care for Managing Trauma on the Battlefield**

- **Used by Army, Navy, Air Force, Marine Corps, Coast Guard**
- **Used by most coalition partner nations**
- **Used by NATO**
- **Used by other countries around the world**



# Objectives

- **EXPLAIN** the differences between military and civilian pre-hospital trauma care
- **DESCRIBE** the key factors influencing combat casualty care
- **UNDERSTAND** how TCCC developed
- **DESCRIBE** the phases of care in TCCC



# Importance of the First Responder

- **Almost 90% of all combat deaths occur before the casualty reaches a Medical Treatment Facility (MTF)**
- The fate of the injured often lies in the hands of the one who provides the first care to the casualty.
- Corpsman, medic, or pararescueman (PJ)
- Combat Lifesaver or non-medical combatant





# Trauma Care Setting



# Tactical Trauma Care Setting - Mrapnel Wound in the Hindu Kush





# Prehospital Trauma Care: Military vs. Civilian

- **Hostile fire**
- **Darkness**
- **Environmental extremes**
- **Different wounding epidemiology**
- **Limited equipment**
- **Need for tactical maneuver**
- **Long delays to hospital care**
- **Different medic training and experience**





# Prior Medical Training

- Combat medical training historically was modeled on civilian courses
  - Emergency Medical Technician
  - Advanced Trauma Life Support
- Trained to standard of care in non-tactical (civilian) settings
- Tactical elements not considered



# Different Trauma Requires Different Care Strategies

- It is intuitive that combat and civilian trauma are different, BUT...
- It is difficult to devise and implement needed changes.
- No one group of medical professionals has all of the necessary skills and experience.
- Trauma docs and combat medical personnel have different skill sets. Both are needed to optimize battlefield trauma care strategies.
- Tourniquets are one striking example of how battlefield trauma care has sometimes been slow to change.





# **Tourniquets in WWII**

## **Wolff AMEDD J April 1945**

“We believe that the strap-and-buckle tourniquet in common use is ineffective in most instances under field conditions...it rarely controls bleeding no matter how tightly applied.”



# Vietnam

Over 2500 deaths occurred in Vietnam secondary to hemorrhage from extremity wounds. These casualties had no other injuries.





# **Tourniquets in U.S Military**

**Mid-1990s**

- **Old strap-and-buckle tourniquets were still being issued.**
- **Medics and corpsmen were being trained in courses where they were taught **not** to use them.**





# **SOF Deaths in the GWOT**

**Holcomb, et al**  
***Annals of Surgery 2007***

## **Factors That Might Have Changed Outcomes (82 Fatalities - 12 Potentially Survivable)**

- **Hemostatic dressings/direct pressure (2)**
- **Tourniquets (3)**
- **Faster CASEVAC or IV hemostatic agents (7)**
- **Surgical airway vs. intubation**
- **Needle thoracostomy**
- **PRBCs on helos (2)**
- **Battlefield antibiotics**





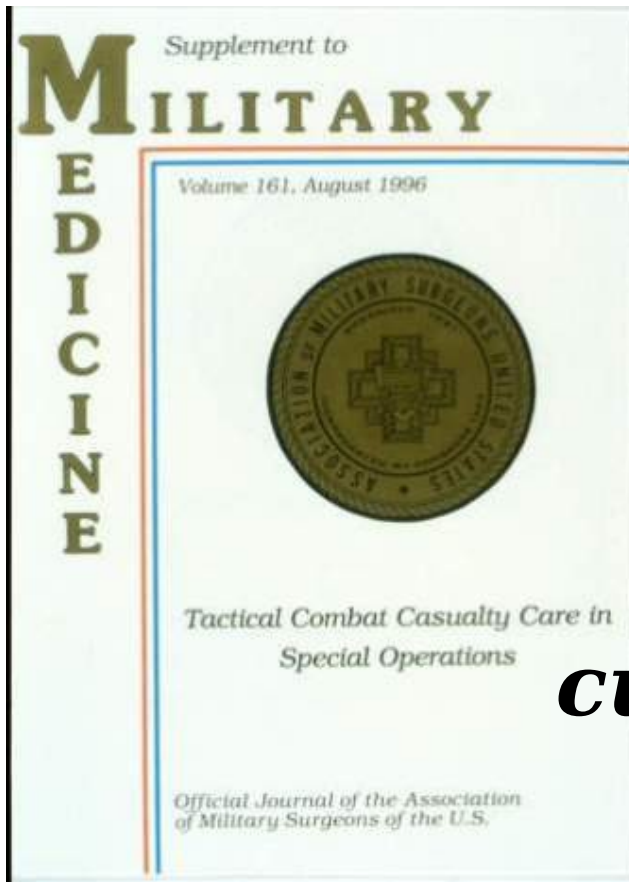
# Tourniquets - Beekley et al Journal of Trauma 2008

- 31<sup>st</sup> CSH in 2004
- 165 casualties with severe extremity trauma
- 67 with prehospital tourniquets; 98 without
- Seven deaths
- **Four of the seven deaths were potentially preventable had an adequate prehospital tourniquet been placed**





# Tactical Combat Casualty Care in Special Operations



## Military Medicine Supplement August 1996

*Trauma care guidelines  
customized for the battlefield*



# TCCC

- Originally a Special Operations research effort
- Trauma management plans that take into account the unique challenges faced by combat medical personnel
- Now used throughout U.S. military and by most allied countries
- **TCCC has helped U.S. combat forces to achieve the highest casualty survival rate in history.**



# TCCC Approach

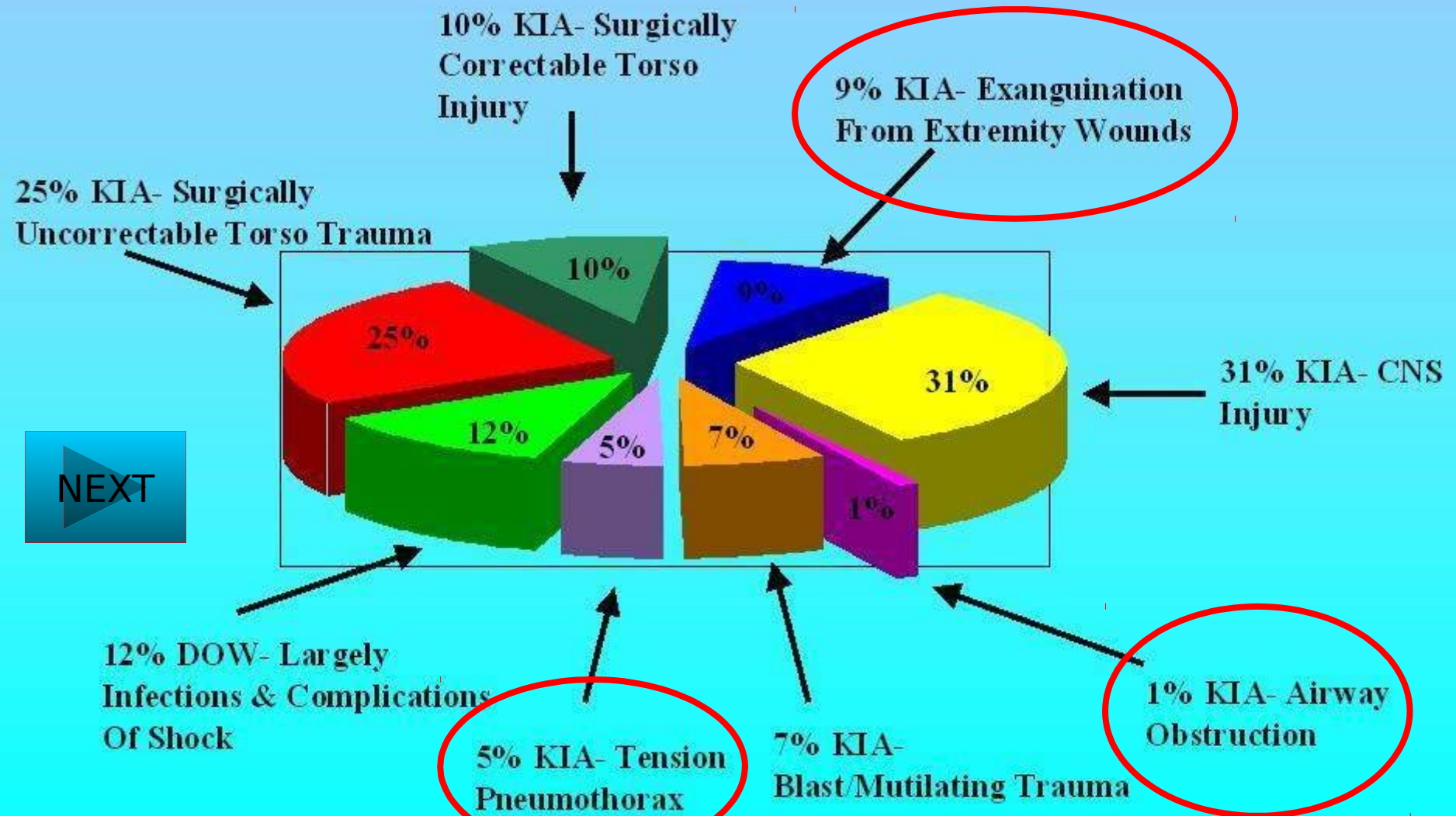
- Identify the causes of preventable death on the battlefield
- Address them aggressively
- **Combine good medicine with good tactics**





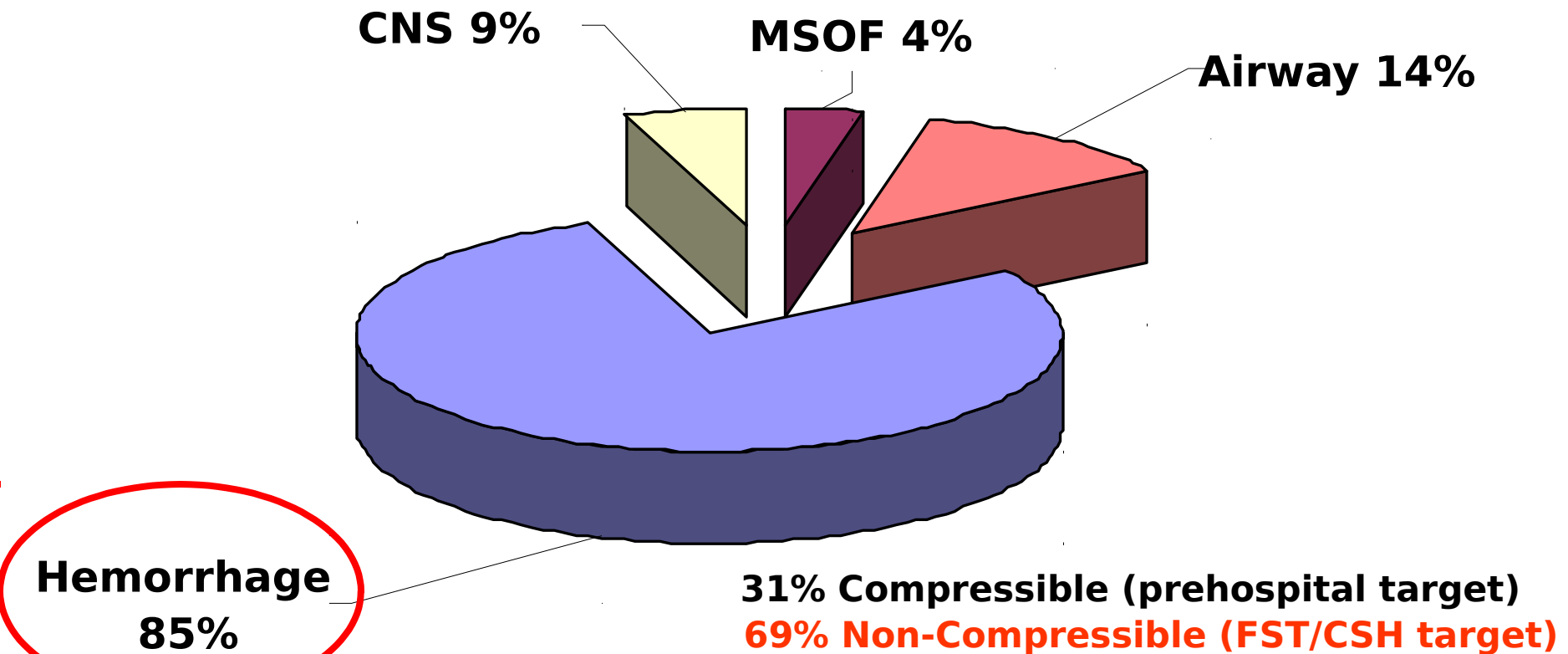
# How People Die In Ground Combat (From COL Ron Bellamy)

Data based on the Wound Data Munitions Effectiveness Team (WDMET) during the Vietnam War between 1967 and 19





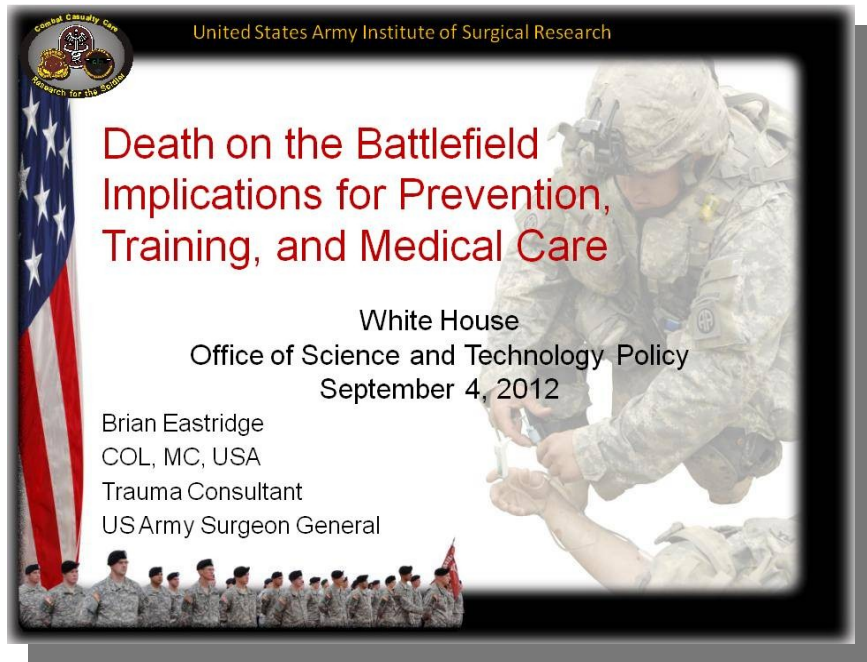
# Potentially Preventable Deaths (232) in OIF and OEF



From evaluation of 982 casualties, and casualties could have more than 1 cause of death. (Kelly J., J Trauma 64:S21, 2008)



# Preventable Death on the Battlefield: OEF and OIF



## Eastridge 2012 Study:

- **4,596** U.S. deaths
- **87%** pre-hospital deaths
- **24%** of pre-hospital deaths were preventable

Holcomb, et al, 2005 - US SOF Preventable Deaths = **15%**

Kelly, et al, 2008 - US Military Preventable Deaths = **24%**

Unclassified





# **Point of Wounding Care**

**Causes of preventable death on the battlefield today:**

- Hemorrhage from extremity wounds**
- Junctional hemorrhage (where an arm or leg joins the torso, such as in the groin area after a high traumatic amputation)**
- Non-compressible hemorrhage (such as a gunshot wound to the abdomen)**
- Tension pneumothorax**



# Junctional Hemorrhage



These types of wounds are often caused by IEDs and may result in junctional hemorrhage.



# Extremity Hemorrhage

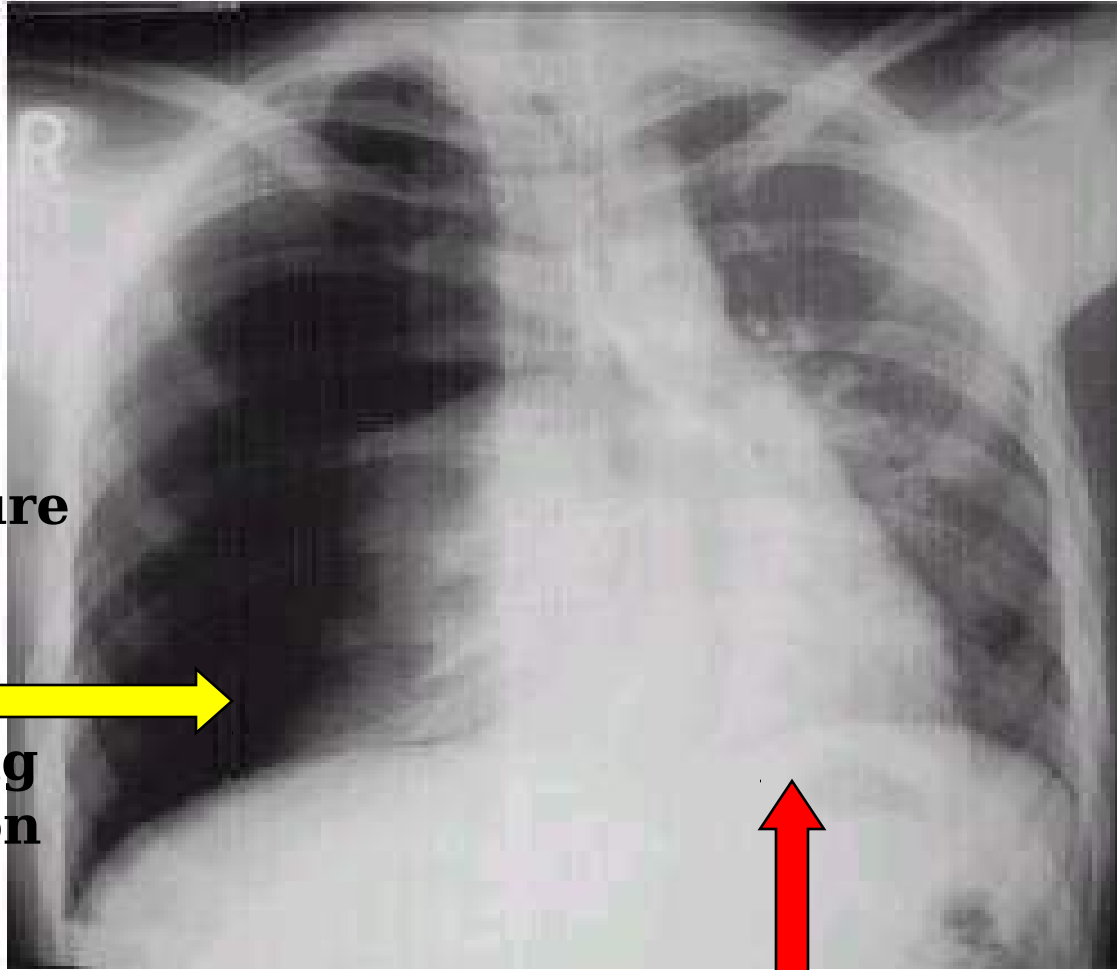


**Click on picture to start video**



# Tension Pneumothorax

**Air escapes  
from injured  
lung - pressure  
builds  
up in chest  
Air pressure  
collapses lung  
and pushes on  
heart**



**Heart compressed -  
not able to pump well**



# Airway Trauma





# Three Objectives of TCCC

- **Treat the casualty**
- **Prevent additional casualties**
- **Complete the mission**







# **TCCC Guidelines 1996**

- Tourniquets**
- Aggressive needle thoracostomy**
- Nasopharyngeal airways**
- Surgical airways for maxillofacial trauma**
- Tactically appropriate fluid resuscitation**
- Battlefield antibiotics**
- Improved battlefield analgesia**
- Combine good tactics and good medicine**
- Scenario-based training**



# **Changes in TCCC: How Are They Made?**



**The Committee on Tactical  
Combat Casualty Care**





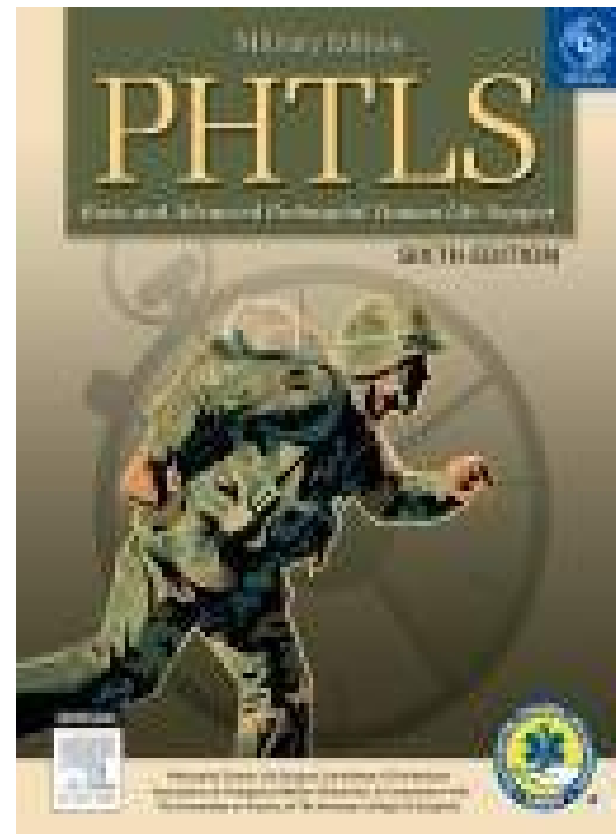
# Committee on Tactical Combat Casualty Care

- **Part of the Joint Trauma System**
- **42 members from all services in the DoD and civilian sector**
- **Trauma Surgeons, ER and Critical Care physicians, operational physicians; medical educators; combat medics, corpsmen, and PJs**
- **100% deployed experience**
- **Meet periodically; update TCCC as needed**



# TCCC Now: Additional Interventions

- **Hemostatic dressings**
- **Intraosseous infusion devices**
- **Hypotensive resuscitation**
- **Fentanyl lozenges for severe pain**
- **Ketamine as an analgesic option**
- **Junctional hemorrhage control devices and TXA**
- **Hypothermia prevention**
- **Management of wounded hostile**





# TCCC: How Do We Know That it's Working?





# TCCC

**“I am writing to offer my congratulations for the recent dramatic advances in prehospital trauma care delivered by the U.S. military. Multiple recent publications have shown that Tactical Combat Casualty Care is saving lives on the battlefield.”**

***Dr. Jeff Salomone***

***American College of Surgeons Committee on Trauma***

***Chairman of Prehospital Trauma Subcommittee***



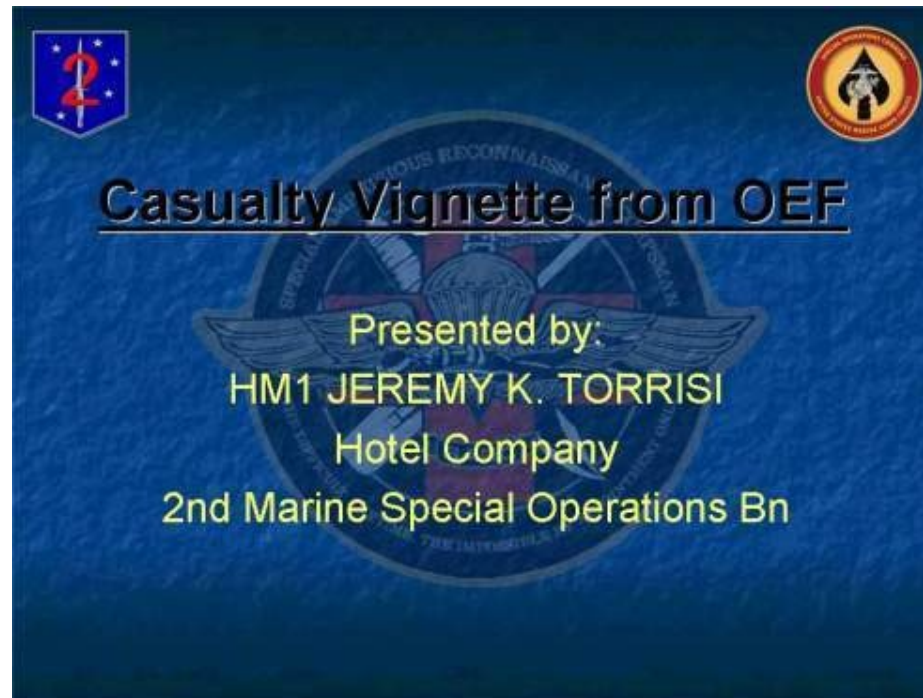
# **Mabry and McManus AMEDD Center and School**

**“The new concept of Tactical Combat Casualty Care has revolutionized the management of combat casualties in the prehospital tactical setting.”**

***Critical Care Medicine  
July 2008***



# USMC Casualty Scenario 2008



CoTCCC gets input directly from combat medic  
corpsmen, and USAF pararescuemen (PJs)  
5 casualties - 4 tourniquets applied  
lives saved - 4<sup>th</sup> casualty died from chest wound



# Tourniquets - Kragh et al:

## Two Landmark Papers



- Published in 2008/2009
- Tourniquets are saving lives on the battlefield
- **31 lives saved in 6 months** by tourniquets
- **Author estimates 2000 lives saved with tourniquets**



# What Do the Soldiers Say?

A recent U.S. Army Training and Doctrine Command survey of Soldiers in combat units found that **TCCC is the second most valued element** of their training, exceeded only by training in the use of their individual weapon.



*COL Karen*

*Leon*





# Preventable Death on the Field



- TCCC in the 75<sup>th</sup> Ranger Regiment
- All Rangers and docs trained in TCCC
- Ranger preventable death incidence: **3%**



# Hartford Consensus

## 2 April 2013

- **Working group organized by American College of Surgeons Board of Regents and FBI**
- **In response to Sandy Hook shootings**

Life threatening injuries in active shooter incidents such as those in Fort Hood, Tucson, and Aurora are similar to those encountered in combat settings. Military experience has shown that the number one cause of preventable death in victims of penetrating trauma is hemorrhage. Tactical Combat Casualty Care (TCCC) programs, when implemented with strong leadership support, have produced dramatic reductions in preventable death. Recognizing that active shooter incidents can occur in any community, the Hartford Consensus encourages the use of existing techniques and equipment, validated by over a decade of well-documented clinical evidence.



# ASDHA TCCC Letter

## 14 February 2014



HEALTH AFFAIRS

THE ASSISTANT SECRETARY OF DEFENSE

1200 DEFENSE PENTAGON  
WASHINGTON, DC 20301-1200

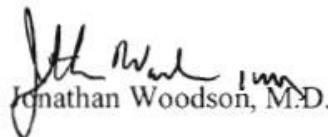
FEB 14 2014

MEMORANDUM FOR DIRECTOR, DEFENSE HEALTH BOARD

SUBJECT: Tactical Combat Casualty Care Training for Deploying Personnel, 2011-02

Please accept my appreciation for your continued efforts to provide the Department of Defense with constructive recommendations to help maximize the health, safety, and effectiveness of the U.S. Armed Forces. As we continue to seek opportunities to improve and standardize medical training, we have reviewed and will accept your recommendations related to "Tactical Combat Casualty Care (TCCC) Training for Deploying Personnel." We will incorporate training guidance as described in your recommendation to facilitate uniform TCCC training throughout the Department.

The point of contact for questions regarding this action is Ms. Elizabeth Fudge. Ms. Fudge may be reached at (703) 681-8295, or [Elizabeth.Fudge@dha.mil](mailto:Elizabeth.Fudge@dha.mil).

  
Jonathan Woodson, M.D.



# **USFOR-A FRAGO 14-067**

## **21 March 2014**

- **All physicians, physician assistants, nurse practitioners, medics, corpsmen, parajumpers (PJs) and nurses in CJOA-A (Afghanistan) will be trained in TCCC**
- **Training will be done in accordance with current TCCC Guidelines (found on Joint Trauma System website)**
- **Curriculum to support this training is found on the Military Health System website**
- **Training is reportable to the chain of command**
- **Units will field equipment to perform**



# Phases of Care in TCCC: Timing Is Everything

- Casualty scenarios in combat usually entail both a medical problem and a tactical problem.
- We want the best possible outcome for both the casualty and the mission.
- Good medicine can sometimes be bad tactics; bad tactics can get everyone killed or cause the mission to fail.
- **Doing the RIGHT THING at the RIGHT TIME is critical.**



# TCCC Phases of Care

- TCCC divides care into 3 phases based on the tactical situation.
- During the gunfight, attention is focused primarily on eliminating the threat.
- As the threat decreases, increasing focus is applied to providing the best possible medical care for the casualties.





# Phases of Care in TCCC

- **Care Under Fire**
- **Tactical Field Care**
- **Tactical Evacuation Care**





# Care Under Fire

Care under fire is the care rendered by the first responder or combatant at the scene of the injury while he and the casualty are still **under effective hostile fire**. Available medical equipment is limited to that carried by the individual or by the medical provider in his or her aid bag.



# Tactical Field Care

Tactical Field Care is the care rendered by the first responder or combatant once he and the casualty are **no longer under effective hostile fire**. It also applies to situations in which an injury has occurred, but there has been no hostile fire.

Available medical equipment is still limited to that carried into the field by unit personnel. Time to evacuation to a medical treatment facility may



# Tactical Evacuation Care

Tactical Evacuation Care is the care rendered once the casualty has been picked up by an aircraft, ground vehicle or boat.

Additional medical personnel and equipment that may have been pre-staged should be available in this phase of casualty management.



# Summary of Key Points

- **Prehospital trauma care in tactical settings is very different from civilian settings.**
- **Tactical and environmental factors have a profound impact on trauma care rendered on the battlefield.**
- **Good medicine can be bad tactics.**
- **Up to 24% of combat deaths today are potentially preventable.**
- **Good first responder care is critical.**
- **TCCC will give you the tools you need!**



# **Summary of Key Points**

- **Three phases of care in TCCC**
  - **Care Under Fire**
  - **Tactical Field Care**
  - **TACEVAC Care**



# Summary of Key Points

- **TCCC - designed for combat**
- **NOT designed for civilian trauma settings**
- **But may have applicability in some**





# Questions?

